CONGRATULATIONS, YOU'RE AN ARTIST

In the Introduction we talked about society's renewed appreciation for the importance of creativity in all aspects of work and life. We argued that we can learn much from those who have dedicated their lives to creative pursuits—the artists. And we said that we all have the ability to be artists.

That might be a hard sell for those of you who have still not gotten over the trauma of your first botched Paint by Number kit. You may feel that you're as creative as a box of saltines. But that's where you are wrong. Everyone has creative ability; everyone is, in a sense, an artist. As Steven Pinker, Harvard psychology professor and author of *How the Mind Works*, puts it: "All of us are creative. Every time we stick a handy object under the leg of a wobbly table or

think up a new way to bribe a child into his pajamas, we have used our faculties to create a novel outcome." Pinker may be overstating a bit. The first person who stuck something under the chair was being creative; the rest of us are just followers after all. But we understand what Pinker is getting at. It's strange to think of bribing a child as an act of creativity, but when it dawns on you that the promise of "helping" dad shave in the morning might just get your child to bed in time for you to watch the rest of the game, it may not seem like art, but it is an original idea of enormous value.

Part of what makes people think that they can't possibly be creative types is that they are often blind to the creative thinking around them. They recognize the artistic genius of an Andy Warhol or an Amy Winehouse, and appreciate the innovative brilliance of a Thomas Edison or a Steve Jobs. But much far-less glamorous work, like everyday problem solving, is evidence of creativity too.

Not long ago, we were talking with some neighbours about how exhausting it was to wait up for teenage kids to make sure they got home at the agreed-upon time. One neighbour said that he didn't have a problem with that. He was using his parents' trick to get the sleep he needed. He grew up in the country and his parents had been farmers most of their lives. Even if they wanted to, they weren't able to sleep in. So they headed to bed early. When their son got to be a teen, however, they wanted to make sure he adhered to a curfew that was a good deal later than their preferred bedtime. So

they set their bedroom alarm clock to five minutes past the curfew time and went to sleep. The teen had to get home in time to turn the alarm clock off. If he was late, and his parents were awoken by the alarm, he was grounded for a week. Simple. Effective. Ingenious. Creative.

Dr. John Semple, in his *Globe and Mail* profile and in his conversation with us, agrees that creative thinking is all around us. "The idea that creativity is part of everyday thinking is something I use all the time," he says, "specifically in my capacity for dealing with abstract ideas. I find a lot of people fear facing abstract notions, and will retreat to known components." (He notes that this is why scientific research often advances only incrementally.) But a painter is trained to face a blank canvas, and deal with it head-on. While he hastens to point out that there can't really be any self-expression in surgery—"you have to stick to the plan"—he notes than in medical research, being comfortable with or attracted to abstract ideas can lead to looking at things in original ways: "That might be in terms of microvascular blood flow, or different ways the body can heal or be encouraged to heal."

There's no doubt that many of us are not the "artists" we once were. For starters, most of us don't use our imaginations the way we used to. Children are imaginative geniuses. Just spend a little time with a four-year-old, and you'll enter the world of chocolate ponds and pet dragons and cabbages that can fly. Self-driving cars? Four-year-olds have understood the possibilities ever since the Model T hit

the road. Living on the moon? Of course. Communication with dolphins or apes or bees? Four-year-olds are surprised that *you* are surprised that these things are now known realities. As pediatric psychologist Mark Bowers observes, "Creativity is at a high point from age three to five."

And the amazing thing about the rich fantasy world of children is that no one shows them how to enter. They are *born* into it. Indeed, educators and developmental psychologists have provided plenty of evidence that the imagination plays a key role in the way children learn about the world. Imaginative play is how children recognize that their thoughts differ from those of others, and it encourages empathy, impulse control, social skills and the expression of emotion. Playing "let's pretend" has also been shown to help vocabulary, improve academic readiness and enhance intellectual curiosity. And not surprisingly, children who engage in more imaginative play demonstrate stronger creative abilities when they become adults. So all of those imaginary friends, all of those talking gerbils, all of those living room carpets that are really quicksand are an important part of our cognitive development—and of our future creative lives.

Even as children learn about the world and replace their role-playing and imaginative space with knowledge, facts and practical skills, they tend to engage in far more creative activities than most adults allow themselves. Who among us hasn't displayed nascent thespian talents in a grade-school production of *The Three Little Pigs*?

And who hasn't belted out "Frosty the Snowman" at the annual holiday showcase? As kids, we painted and drew and sculpted (although our parents were usually pretty stingy with the Carrara marble). We may have spent days or weeks designing our Halloween costumes or hours pouring our hearts into poetry or song lyrics. We may have built elaborate Lego empires or ingenious blanket forts. We might have taken dance lessons or taught ourselves how to play "Takin' Care of Business" on the guitar.

Unfortunately, for many of us, those artistic pursuits fell by the wayside as we grew older. Report cards and competition perhaps made us aware that we weren't as good at some of those things as other kids were, so we backed off. We may have been told that such activities were "only for fun," that we needed to concentrate on more serious matters. Or we may have simply been defeated by the repeated question, "What do you want to be when you grow up?" Chances are if we said we wanted to be a painter or a musician or an actor, we heard that those were "unrealistic" goals at best. Actuarial accounting, internal medicine, personal injury law—now those are real careers!

International education advisor Ken Robinson has argued in his books and TED talks that our education system, created to address the needs of a past society and not those of our current world, actually beats the creativity out of us. The acquisition of knowledge, the command of facts, the mastery of rational thought and the following of rules have become all-important—and have made

creativity an unwelcome guest in the classroom. (Music and visual arts are usually regarded as the entertaining "extras" in a student's school day.)

Robinson notes that a number of studies have shown that teachers put creative students at the bottom of their "favourites" list (more about this in Chapter 8), which reminds us of a story we recently heard from a friend who was trying to get her four-year-old son into a prestigious private school. This was going to be an uphill battle—especially after the little guy told her what happened during an entrance assessment with a school administrator. The interview involved completing a number of "tests." In one, the boy was asked to reproduce the shapes that had been drawn on a piece of paper. "Did you have trouble drawing the shapes?" asked his mother. "Nah, I didn't draw them," he said. "Why not?" said his mother, alarmed. "That would have been dumb," he said. "They had all those shapes already. I drew them some *new* ones."

Who could argue with that logic? Faced with a boring triangle, the little guy had let loose with wild trapezoids and ballooning parabolas. Very creative. Very not-what-the-school-was-looking-for. He didn't get in.

So, for most of us, a good deal of our imaginative, artistic life has been forgotten in our childhood closets, along with Lego and outgrown clothes. And yet even people who have left artistic ambitions behind have not lost their creative selves or abandoned their creative impulses entirely. If they had, how to explain the incredible success

of companies like League of Rock? Terry Moshenberg's brilliant idea was to create a way for lawyers, marketers, teachers and stay-at-home parents (and anyone else) to embrace their inner Bruce Springsteens. Sign up, pay your dough and you get to be in a band for ten weeks.

Each band is mentored by an experienced producer, and at the end of the ten weeks, they perform live in front of family and friends. League of Rock delivers the complete rock experience (excluding heroin, groupies and "backstage passes").

Many Rolling Stones wannabes have flocked to League of Rock because it lets them rediscover the creative and expressive spirit they had in their youth. It allows them to literally be the rock stars they dreamed of being before mortgage payments and the BabyBjörn got in the way. The marketing campaign cleverly underlined the attraction of this creative outlet for the responsible business types. "Stick it to the man!" the posters declared. "Even if you *are* the man."

Of course, League of Rock isn't the only avenue for cubicle dwellers and the like to return to the artistic pursuits of their youth. Technology is now making it much easier to re-engage. Cellphone cameras and Photoshop have made it possible for everyone to be Ansel Adams when the mood strikes. YouTube offers thousands of DIY music and art tutorials. Online writing workshops and writers' circles are popping up all over the Web. Word processors everywhere are filling up

with first-draft novels. And then there's the frighteningly enduring appeal of karaoke.

What Moshenberg and others have recognized is that for most adults the artistic spirit never left; only the ability to realize it did.

Of course, being creative is not just about picking up a paintbrush or a guitar. As we discussed in the Introduction, creativity can happen and should happen in the home and in the workplace. It is the key to problem solving and innovation. You may never sign up for League of Rock, but you need to exercise your creative side nonetheless.

The good news about creative ability is that we all have some, even if we've neglected it, and we can all improve it. But before looking at how to improve, we'll examine more closely at how creativity works.

Numerous psychologists and researchers have rejected the idea that creative geniuses are struck out of the blue by a visit from the muse. Samuel Coleridge and Edgar Allan Poe may have implied—or flat-out claimed—that their writing was the product of flashes of inspiration, fully realized ideas and lines of poetry popping unbidden into their minds, but careful reading of their journals and other evidence suggests that their work was the end result of a long process of trial and error, of writing and rewriting, of good old-fashioned slogging.

And yet, obviously there is something about the work of great artists that is exceptional. How do we explain that sort of creative thinking, those fabulous ideas?

In the mid-1920s, social psychologist Graham Wallas put forth one of the first theories about how the creative process works. It has stood the test of time surprisingly well. He suggested that there were five phases. First, planning or *preparation*, where the problem to be solved was set out. The next was *incubation*, a period of rest from thinking about the problem consciously. That was followed by *intimation*, the sensation that an idea is about to pop into your head, and *illumination*, the period during which the idea presents itself, and we become conscious of it. (Intimation and illumination are often considered two parts of the same stage.) Finally, there is *verification*, in which ideas are selected, tested and revised.

A great deal of research and study has centred on incubation and illumination, but the preparation and verification stages—not so much. These phases are hard to study because they tend to happen over longer periods of time (and test subjects are loath to spend days lying in brain-imaging machines). They also seem a good deal less mysterious: planning and reworking are things most of us do all of the time. But it's important to note that the preparation stage usually refers to a problem or challenge that's been identified—in other words, creativity doesn't usually come out of nowhere. In fact, the notion that constraints inhibit creativity appears to be misguided. Often hurdles or limitations get the creative juices flowing. If that sounds counterintuitive, just think of Michelangelo being asked to do a painting on the ceiling of the Sistine Chapel. The

relatively small space is dark, and the ceiling is curved in a way that means that viewers are going to be looking at the artwork at decidedly unusual angles—never mind the fact that he was going to have to lie on his back, metres above the floor, for years. Michelangelo addressed these problems not just adequately but brilliantly.

And that final phase of creative thinking, verification, while not sounding as sexy an idea as generation, is absolutely essential to producing ideas that have value. Once we've generated lots of ideas, we winnow through them and pick the ones that look the most promising—what some theorists call "selection." Then we test them, polish them, revise them. In other words, we engage in some exploration and tinkering.

Creative geniuses, it's worth noting, are really, really good at this last stage of the creative process. They have sophisticated levels of discernment and are skilled at recognizing which ideas have value and which don't. (If we look to creativity in practice—innovation—we can come up with all sorts of examples of when that last phase is botched. Product ideas that were original or "new" but didn't have much value or meaning and have sunk into oblivion. Carbonated yoghurt. Cheeseburgers in a can. Cheetos-flavoured lip balm. All real products, we kid you not. All mercifully no longer available for purchase. And all proving that *selection is important*.)

Ken Robinson notes that creativity can only flourish when we give ourselves time to move through the neces-

sary phases. If we focus on selection too early, our internal critic can inhibit our ideas guy.

And what about the creation of those ideas? The incubation period is key to the mystery of creativity. It's a time when the conscious brain is absorbed with other tasks—say, planting your garden or shampooing your hair. In other words, it's time when you aren't looking at a problem head-on or thinking about it in a deliberate way. Some psychologists believe this period of unconscious associative processing allows the unconscious to take over and make connections that your conscious brain might reject as illogical or irrelevant. Others believe that a period of not thinking about the problem at hand allows you to forget about misleading information so that your unconscious brain can play with only the most meaningful parts of the puzzle.

Other psychologists and researchers focus on convergent–divergent thinking when talking about the process of idea generation, noting that divergent thinking, the ability to generate many possible answers to a question, is the initial stage of creativity, and is followed by convergent thinking, focusing on a single answer, winnowing down the options. The theory of conceptual blending posits that creativity arises from the intersection of different frames of reference, like the process by which we come up with metaphors and analogies.

These and other ways of describing the creative process are complemented by the research of neurologists who

have been trying to use brain imaging and other methods of studying brain function to determine what's going on in that incubation period, how we access that state and how it connects to idea generation.

And while this whole process is still essentially a mystery, we are uncovering a few interesting facts about how our grey matter functions. Studies of the brain using functional MRI machines have shown that when creative thinking and doing happen, activity in part of the prefrontal cortex quiets. This area—the dorsolateral prefrontal cortex (DLPFC)—is a part of the executive control network of the brain and is thought to be involved with self-censoring, impulse control and inhibition, among other things. It appears that when this calm master of control is sent on lunch break, the imagination has a bit more room to play. This area more or less shuts down completely when we enter the REM cycle of sleep—the phase during which we dream. So perhaps not surprisingly, studies have shown that people demonstrate more creative ability immediately after a period of REM sleep. The DLPFC is also an area of the brain that develops quite late, so it really should be no surprise that most people are considerably more imaginative at six than at sixty. (Apparently we can't entirely blame teachers and parents for the loss of our fantasy worlds.)

Rex Jung, a neuropsychologist and professor at the University of New Mexico, is one of the researchers who have been studying brain images to see what happens during creative thought. Some of his research has focused on what parts of the brain seem to be most engaged when

subjects are involved in the incubation and illumination phases. His brain-imaging studies suggest that when we are in the incubation phase, parts of the default-mode network become active. These are the areas of the brain that take over when you are at rest or not focused on a task, and they are especially active when you are daydreaming or allowing your mind to wander. Interviewed for the *Atlantic*, Jung puts it this way: "You're looking inward instead of solving the problems of the world." And when this part of the brain is engaged, he suggests, ideas are allowed to connect and cross-pollinate in ways they might not have otherwise. But when you are ready to express that idea (Wallas's illumination phase), Jung has observed, the cognitive or "executive" control network, areas of the brain that appear to be involved with planning, directing and implementing thought, kick into gear.

Jung noted that interactions between these areas seem to be the key to creativity: "We see that the most highly creative people flip easily between the two and are better able to modulate these networks." A number of other studies have also shown that these two networks seem to work closely together during intense periods of creativity. Jung's studies have also suggested that highly creative people not only come up with more ideas, they come up with more good ones too.

Right about now, you may be feeling that all of this is well and good, but knowing about how your brain works is not going to help you have "eureka!" moments any more

than understanding how your fridge works is going to make it any colder. But you may be wrong. It seems that we may be able to tinker with our mental machinery. A 2008 experiment conducted by Johns Hopkins researchers put jazz musicians into fMRI machines and asked them to start improvising. What the researchers noticed was that just as the musicians started playing, the DLPFC area went quiet—as if the jazz artists had simply turned it off. While the musicians were no doubt unaware that they were doing this (and they certainly weren't conscious of what parts of their brains were lighting up on the imaging screens), this fascinating phenomenon suggests the rest of us might also be able to move ourselves into a creative headspace at will.

The key may be learning to let our minds wander. In a *New Yorker* article entitled "How Caffeine Can Cramp Creativity," psychologist Maria Konnikova writes:

> *Creative insights and imaginative solutions often occur when we stop working on a particular problem and let our mind move on to something unrelated. In one recent study, participants showed marked improvements on a task requiring creative thought—thinking of alternative uses for a common object, such as a newspaper—after they had engaged in a different, undemanding task that facilitated mind wandering. The more their mind wandered when they stepped away, the better they fared at being creative. In fact, the benefit was not*

seen at all when the subjects engaged in an unrelated but demanding task.

Konnikova goes on to explain that research has shown that caffeine interferes with creativity by focusing our thoughts and preventing our mind from wandering.

What we can take away from all of this is that there is a strong scientific argument for staring out the office window and wondering where to take your next holiday instead of obsessing about that new building design you are supposed to be working on. Part of thinking more creatively is letting yourself go a little.

And there's even more scientific evidence that we are able to improve our creative muscle. Researchers at the University of Reading in the U.K. and the University of Minnesota discovered that when people do warm-up exercises in creative thinking, they perform much better in subsequent creative-thinking tasks. In the study, subjects were asked to generate alternative uses for a common object, like a ping-pong ball or a brick. They did this for as little as ten minutes. After the warm-up, they were asked to solve insight puzzles along with other tests of creative thinking. Those who had done the alternative-uses exercises did much better at these tasks than those who had done word-association warm-ups or no warm-ups at all.

The usefulness of creative-thinking exercises in improving our mental flexibility was also studied using fMRI machines by researchers at the Ministry of Education and the School of

Psychology in Chongqing, China. Images were made of brain activity when the subjects were at rest. The participants then engaged in an alternative-uses exercise and were put back into the fMRI. The images of their brains at rest *after* they had been generating novel ideas for using household items or for making a child's toy more fun showed much stronger communication between two areas of the brain—one that appears to be involved when the imagination is employed in story generation or improvisation, and one that is active in linking or expanding ideas and in metaphorical thinking. This increased connectivity then appeared to produce much better results in subsequent creativity tests—particularly for those who had scored lowest on baseline creativity at the start of the study.

What is really going on in the twists and folds of our brain tissue when we are being creative is still essentially a mystery. But these scientific studies do support the anecdotal evidence that we can actually improve our creativity power. It seems that, with some effort, we can put ourselves into mental states that allow for divergent thought. And we can strengthen our creative muscle by using it more often.

In the following chapters, we are going to look at some of the ways artists and innovators access their imagination and generate ideas. (It's also worth noting that there are a host of seminars, self-help books and online articles that provide tips and techniques for gaining access to the unconscious wellspring of creativity.) But it's important

to recognize that each of us has our own way of getting the little mental break that allows our creative self to blossom. Some are downright strange. Painter Francis Bacon, a heavy drinker, didn't credit inebriation with releasing his creative energy, but rather the post-binge period: "I often like working with a hangover," he said, "because my mind is crackling with energy and I think very clearly." If you substitute the words *energy* with *pain* and *working* with *lying on the couch moaning like a plague victim*, then many of us have a lot in common with Francis. But we're not getting much creative thinking done.

Bacon is not the only artist who had a liking for mind-altering substances, but most have less dramatic ways of finding inspiration and doing what they do. Adopting some of their habits, attitudes and outlooks can help us become our best creative selves and rediscover the natural artists we were when we were young. But first we may need to change how we see ourselves in order to let that happen.

In other words, we may need to reinvent ourselves.